



MODULE SPECIFICATION

Faculty of Engineering

Last Updated: 22 October 2018

1. Module Title

Design and Manufacture

2. Module Code

EM2110

3. Number of credits

10

4. Level

2

5. Semester

4

6. Pre-requisites for admission to the module

Normal progression rules

7. Module Coordinator

Dr Ahmad Syamaizar Bin Hj Ahmad Sabli

8. Aims

Students will learn the methodologies involved during the process of design and manufacture of individual parts and assemblies. This includes material selection and the design for primary manufacturing processes. This module will also establish the links between design, material selection, cost analysis, understanding behavior of materials during operation and manufacturing processes.

9. Summary of Content

The module covers the following topics:

- **Engineering Design Process:** Material selection, Cost analysis, Detail Design, Design for assemblies, Design for manufacture
- **Welding:** electric arc welding, inert gas welding (MIG & TIG), Submerged arc welding, gas welding, spot welding, welding assembly methods, limitations;
- **Plastic Moulding:** concept, methods, limitations and applications;
- **Plastic behavior of materials,** engineering stress and strain, natural stress and strain, effects on material properties by strain, or strain rate, temperature and hydrostatic stresses, cold working, anisotropy.
- **Analysis of metal forming processes:** Bending, deep drawing, blanking & piercing, analytical techniques applied to metal forming.

10. Module Intended Learning Outcomes (MILOs)

Upon successful completion of this module, students will be able to:

No.	MILOs	Weightage (%)
1	Apply the engineering design process to solve engineering problems.	15
2	Distinguish between different weld operations for assemblies and Sub-Assemblies.	15
3	Demonstrate understanding of basic manufacturing processes and capabilities of each process.	20
4	Select suitable materials and manufacturing processes for a particular problem.	20
5	Design and fabricate a sheet metal product.	30

11. Teaching and Learning Activities (TLAs)

MILO No.	TLAs	Functions	Hours/Week
1 - 4	Lecture	Oral presentation intended to present and convey critical information and theories	1
2 - 5	Laboratory Practical	Interactive problem-solving session used for transfer of knowledge	3

12. Assessment of Module Intended Learning Outcomes (MILOs)

MILO No.	Type of Assessment Tasks/Activities	Weightage (%)
1	Assignment	15
2 - 4	2 Laboratory Report	15
2 - 4	Class Test	10
1 - 5	Group Project	60

Assessment Criteria:

Assessment components of the module shall be 100% Coursework. To achieve a pass in the module students must obtain a minimum overall mark of 40%.

Reassessment: Students eligible for reassessment shall be assessed according to the programme area examination board recommendation.

13. Attendance Requirements

Students are required to attend all lectures, tutorials and laboratory sessions.

14. Contribution to Programme Intended Learning Outcomes

PILO		MILO No.				
		1	2	3	4	5
1	Science & Mathematics		✓	✓	✓	
2	Engineering Analysis	✓	✓	✓	✓	✓
3	Design	✓	✓			✓
4	Advanced Design					✓
5	Economic, Legal, Social and Ethical Contexts				✓	✓
6	Engineering Practice	✓	✓	✓	✓	✓
7	General Skills				✓	✓

15. Grading of Student Achievement

Marks (%)	Grades	Grade Definition
85-100	A+	Excellent
75-84	A	
70-74	B+	Very Good
65-69	B	
60-64	C+	Good
55-59	C	
50-54	D+	Satisfactory
45-49	D	
40-44	E	Marginal
0-39	F	Fail

16.Resources

Primary texts

No	Name of Author(s)	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	E. Paul De Garmo	2017	Materials and Processes in Manufacturing	12 th	John Wiley & Sons	978-1-119-38289-8
2	C Jensen, J Helsel, D Short	2016	Engineering Drawing And Design	6 th	Delmar Cengage Learning	978-1305659728

Secondary texts

No	Name of Author(s)	Year of Publication	Title of Book	Edition	Publisher's Name	ISBN
1	Kalpakjian s, Steven R.Schmid	2016	Manufacturing Processes for Engineering Materials	6 th	Pearson Education	978-0134290553
2	Kalpakjian s, Steven R.Schmid	2013	Manufacturing Engineering & Technology	7 th	Pearson Education	0133128741
3	Jami J. Shah, Martti Mäntylä	1995	Parametric and Feature-Based CAD/CAM: Concepts, Techniques, and Applications	-	Wiley	978-0-471-00214-7